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09/995,206	11/27/2001	Christopher L. Hill	STL10005	9541

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EXAMINER

MILLER, PATRICK L

ART UNIT PAPER NUMBER

2837

DATE MAILED: 05/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/995,206

Applicant(s)

HILL ET AL.

Examiner

Patrick Miller

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-8,13-17 and 31-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-5,7,8,13,15 and 31-33 is/are rejected.
- 7) ☒ Claim(s) 6,14,16 and 17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see "REMARKS" section beginning at line 7, filed on March 31, 2003 with respect to the rejection(s) of claim(s) 1 have been fully considered but they are not persuasive.
 - Specifically, Kardash does disclose removing power (removes power from a coil) if a voltage goes above a threshold voltage; however, the Applicant has amended the claim to specify removing power from the spindle motor, which *does* overcome this rejection.
2. Applicant's arguments, see "REMARKS" section beginning at line 7, filed on March 31, 2003, with respect to the rejection(s) of claim(s) 13 under 35 USC 102(e) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Murase et al (6,008,619).
3. Applicant's arguments, see page two of "REMARKS" section, beginning at line 20, filed March 31, 2003, with respect to the rejection(s) of claim(s) 8 under 35 USC 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Murase et al (6,008,619).

Claim Objections

4. Claim 1 is objected to because of the following informalities: See bullets below.

Appropriate correction is required.

- Claim 1 cites, “applying power to *a* spindle motor.” It is unclear if this motor is the same as that cited in line 1 as “a motor.” Please make terminology consistent.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

5. Claims 1 and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Murase et al (6,008,619).

- Murase et al disclose a method for controlling the power of a spindle motor, comprising the steps of: applying power to the spindle motor (Col. 4, lines 14-20); monitoring the amount of at least a current and a voltage applied to the spindle motor (Col. 9, lines 48-53); obtaining a control voltage proportional to one of the applied current and voltage (Col. 9, lines 56-57); and removing power from the spindle motor if the control voltage exceeds a predetermined voltage threshold (Col. 9, lines 60-63).

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- With respect to claim 8, Murase et al disclose a method for controlling a current drawn by a spindle motor from a power supply, where the power supply supplies power to the motor (Fig. 9, #36 supplies power to #35), and the method comprises the step of: decoupling the power supply from the spindle motor if a control voltage exceeds a predetermined voltage threshold (Col. 9, lines 46-63).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li (4,547,715) in view of Journee et al (5,339,489).

- Li discloses a method for controlling the power of a motor, comprising the steps of: applying power to the spindle motor (Fig. 1, power supplied by #9); monitoring the amount of at least a current and a voltage applied to the spindle motor (Col. 4, lines 30-33); obtaining a control voltage proportional to one of the applied current and voltage (Col. 4, lines 28-30); and removing power from the spindle motor if the control voltage exceeds a predetermined voltage threshold (Col. 4, lines 46-51).
- Li does not explicitly disclose a spindle motor.
- Journee et al disclose a wiper motor that drives a spindle (Col. 5, lines 10-14). That is, Li discloses a motor used for automotive equipment (Li—Col. 2, lines 1-3).

- Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to that the motor described by Li could be used to drive a spindle, as taught by Journee et al.
 - With respect to claim 7, Li discloses further waiting a fixed period of time (Fig. 2, time is from #66 to #68); reapplying power to the motor (Fig. 2, #68); and the repeating aforementioned steps (Fig. 2, current pattern after completion of #68) (Col. 4, lines 58-67).
 - With respect to claim 8, Li discloses a method for controlling a current drawn by a spindle motor from a power supply, where the power supply supplies power to the motor (Fig. 1, #9 supplies power to #18), and the method comprises the step of: decoupling the power supply from the spindle motor if a control voltage exceeds a predetermined voltage threshold (Col. 4, lines 28-67).
7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murase et al as applied to claim 1 above, and further in view of Kim et al (5,245,496).
- Murase et al teach all of the limitations of claim 1 above, but with respect to claim 3, do not disclose the voltage threshold corresponding to a preprogrammed start-up disc profile.
 - Kim et al disclose a current threshold that corresponds to a pre-programmed start-up profile. A person having ordinary skill in the art would know from the reference of Murase et al (6,008,619) that a voltage threshold can perform the same function as that of a current threshold, namely to monitor motor voltage values. The motivation for doing such is so the threshold can be fitted to specific motor operations. That is, the voltage

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threshold can be set higher for start-up conditions, and set lower for running conditions.

This provides the advantage of preventing power from being decoupled from the motor inadvertently (Cols. 2/3, lines 58-68/1-11; Col. 4, lines 43-50).

- Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the voltage threshold of Murase et al so the voltage threshold corresponds to a preprogrammed start-up profile, thereby providing the advantage of preventing power from being decoupled from the motor inadvertently, as taught by Kim et al.
8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murase et al as applied to claim 1 above, and further in view of Sakaguchi (5,767,639).
- Murase et al teach all of the limitations of claim 1 above, but with respect to claim 4, do not disclose obtaining the control voltage by integrating across a current sensing resistor.
 - Sakaguchi discloses obtaining a control voltage for a spindle motor by integrating a voltage across a current sensing resistor (Fig. 5, #74). The motivation for using an integrator to produce a control voltage is to transform the position velocity signal into a matched signal. This provides the advantage in that the signal can be properly amplified.
 - Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to produce a voltage control signal in the device of Murase et al by using an integrating circuit with a current sensing resistor, thereby providing the advantage of matching the input signals, which allows the signals to be properly amplified and compared, as taught by Sakaguchi.

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9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murase et al as applied to claim 1 above, and further in view of Qualich et al (5,949,121).

- Murase et al teach all of the limitations of claim 1 above, but with respect to claim 5, do not disclose the applying power step including for enabling the calibrating of the voltage threshold.
- Qualich et al disclose a threshold voltage connected to a comparator that is calibrated. Qualich et al teach the motivation to calibrate a threshold voltage is to ensure the comparator changes state at a specific voltage. This provides the advantage of ensuring the threshold voltage is correct, which would protect the motor from higher currents, when compared to variations due to an uncalibrated and therefore, unstable threshold voltage value (Col. 3, lines 36-38).
- Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention that the voltage threshold value of Murase et al should be calibrated, thereby providing the advantage of protecting the motor from higher currents, as taught by Qualich et al.

10. Claims 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murase et al (6,008,619) in view of Karwath et al (6,384,554) and Bussin et al (5,293,152).

- With respect to claim 13, Murase et al disclose a data storage device comprising: at least one spindle motor (Col. 1, lines 11-12); a power supply electrically coupled to the spindle motor (Fig. 9, #36); a spindle motor controller (Fig. 9, #10); and the controller decouples power if a threshold value is exceeded (Col. 9, lines 46-63).

- With respect to claim 15, Murase et al disclose the spindle motor controller decoupling power when a control voltage, proportional to at least one of a motor current and motor voltage is greater than a threshold voltage (Col. 9, lines 46-63).
- Murase et al do not disclose the spindle motor controller measuring power and power decoupled if a threshold value (voltage value for claim 15) is *at least met*.
- Karwath et al discloses a controller that measures power from the measured motor current signal (Col. 8, lines 32-37; Col. 9, lines 27-31).
- Bussin et al disclose a comparator circuit that energizes when an input signal is equal to or greater than a reference voltage (Col. 2, lines 50-55). This teaches that the comparator of Murase et al can be configured or replaced by the comparator of Bussin et al, which would energize (send the “control stop signal”) when a voltage value is not only greater than a reference value, but also equal to the reference value. This provides the advantage in that, as soon as the reference value is reached, the motor would be decoupled. This provides a quicker response, and hence better motor and circuit protection, when compared to when the voltage value must exceed the predetermined reference value.
- A person of ordinary skill in the art at the time of the invention would know a controller that measures power could be implemented in the device of Murase et al. Further, it would have been obvious to one having ordinary skill in the art that the power measurement could come from a current and voltage sensor that monitor the motor current level, as taught by Karwath et al. Finally, it would have been obvious to one having ordinary skill in the art at the time of the invention that the comparator of Murase et al could be replaced by a comparator that “energizes” when an input value is equal to

or greater than the reference voltage, thereby providing the advantage providing better circuit protection from high current, as taught by Bussin et al.

11. Claims 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li (4,547,715) in view of Bussin et al (5,293,152).

- Li discloses a method comprising the step of removing power from a motor when a reference value is exceeded (Col. 4, lines 58-62).
- Li does not disclose removing power when the reference is at least matched and does not specify reducing current spikes on a power supply by removing power from the motor.
- With reference to reducing current spikes, a person of ordinary skill in the art would know that removing power as described by Li would reduce current spikes because the current demand on the power supply is reduced.
- Bussin et al disclose a comparator circuit that energizes when an input signal is equal to or greater than a reference voltage (Col. 2, lines 50-55). This teaches that the comparator of Murase et al can be configured or replaced by the comparator of Bussin et al, which would energize (send the “control stop signal”) when a voltage value is not only greater than a reference value, but also equal to the reference value. This provides the advantage in that, as soon as the reference value is reached, the motor would be decoupled. This provides a quicker response, and hence better motor and circuit protection, when compared to when the voltage value must exceed the predetermined reference value.
- Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention that removing power from the circuit as disclosed by Murase et al would reduce current spikes, thereby providing the advantage of protecting the motor and

system circuitry from excessive current. Further, it would have been obvious to one having ordinary skill in the art at the time of the invention that the comparator of Murase et al could be replaced by a comparator that “energizes” when an input value is equal to or greater than the reference voltage, thereby providing the advantage providing better circuit protection from high current, as taught by Bussin et al.

12. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li and Bussin et al, as applied to claim 31 above, and further in view of Brewster et al (5,952,817).

- Li and Bussin et al teach all of the limitations of claim 31 above, but with respect to claim 32, does not disclose the current spikes are high frequency.
- Brewster et al teach that the current spikes experienced in inductive loads are in fact high frequency spikes (Col. 2, lines 43-55). These spikes are caused by abrupt changes when switching operations are performed.
- Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention that removing power from the circuit as disclosed by Li and Bussin et al would reduce high frequency current spikes, thereby providing the advantage of protecting the motor and system circuitry from excessive current, as taught by Brewster et al.

13. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li and Bussin et al, as applied to claim 31 above, and further in view of Journee et al (5,339,489).

- Li and Bussin et al teach all of the limitations of claim 31 above, but with respect to claim 33, does not disclose the motor being a spindle motor.

- Journee et al disclose a wiper motor that drives a spindle (Col. 5, lines 10-14). That is, Li discloses a motor used for automotive equipment (Li—Col. 2, lines 1-3).
- Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to that the motor described by Li and Bussin et al could be used to drive a spindle, as taught by Journee et al.

Allowable Subject Matter

14. Claims 6, 14, 16, and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

- With respect to claim 6, the Prior Art does not disclose using a DAC to compensate for circuit errors or offsets.
- With respect to claim 14, the Li (4,547,715) discloses decoupling power to a motor when the voltage exceeds a voltage threshold, waiting a fixed period of time, and reapplying power, but it would not be obvious to one of ordinary skill in the art to combine this motor with a data storage device.

Prior Art of Record

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Ulrich (3,569,807) discloses turning off a drive circuit when a predetermined current level is reached, waiting a certain time, and then repeating this cycle.
- Nagahama et al (5,719,732) and Nagahama (6,252,752) disclose voltage thresholds that correspond to motor start-up.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see "REMARKS" section beginning at line 7, filed on March 31, 2003 with respect to the rejection(s) of claim(s) 1 have been fully considered but they are not persuasive.
 - Specifically, Kardash does disclose removing power (removes power from a coil) if a voltage goes above a threshold voltage; however, the Applicant has amended the claim to specify removing power from the spindle motor, which *does* overcome this rejection.
2. Applicant's arguments, see "REMARKS" section beginning at line 7, filed on March 31, 2003, with respect to the rejection(s) of claim(s) 13 under 35 USC 102(e) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Murase et al (6,008,619).
3. Applicant's arguments, see page two of "REMARKS" section, beginning at line 20, filed March 31, 2003, with respect to the rejection(s) of claim(s) 8 under 35 USC 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Murase et al (6,008,619).


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